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| HEDMAN & COSTIGAN P.C. 1185 AVENUE OF THE AMERICAS NEW YORK, NY 10036 | | | EXAMINER HAILEY, PATRICIA L | |
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1755

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/830,182

Applicant(s)

GULLA ET AL.

Examiner

Patricia L. Hailey

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-22 and 36-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-22, and 36-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicants' Amendment after Final Rejection filed on March 17, 2006, which previously had been denied entry, has been entered. Claims 1-3 and 5-48 remain pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. ***Claims 1-3, 5-22, and 36-48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.***

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The subject matter present in the claims but not described in the Specification is the word "electrocatalyst" and the phrase "electrically conductive".

Claim Objections

4. *Claims 2, 3, and 5-48 are objected to because of the following informalities:*

These claims are objected to in view of Applicants' amendment to claim 1, which has been amended to include "electrocatalyst" and "electrically conductive" therein; claims 2, 3, and 5-48 have not been amended accordingly.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. *Claims 1-3, 7, 8, 20-22, and 36-40 are rejected under 35 U.S.C. 102(b) as being anticipated by "Methanol Tolerant Oxygen Reduction Catalysts Based on Transition Metal Sulfides", by R. W. Reeve et al. as further evidenced by Ito et al. (U. S. Patent No. 6,649,300, relied upon to provide technological background).*

The Reeve et al. article discloses carbon-supported transition metal sulfide electrocatalysts such as $\text{Mo}_x\text{Ru}_y\text{S}_z$, and $\text{Re}_x\text{Ru}_y\text{S}_z$ (claims 1, 7, and 8), prepared by

refluxing the respective metal carbonyls with sulfur and carbon black such as Vulcan XC-72R (which, as disclosed by Ito et al., can exhibit a BET specific surface area of 240 m²/g, see col. 3, lines 49-65 and Example 1 therein (**claims 2 and 3**). See page 3563 of the article, under the heading "Experimental".

The article also discloses gas diffusion electrodes prepared by applying catalyzed carbons to Teflonized carbon paper substrates using Nafion (**claims 20-22 and 36-40**). See page 3464 of the Reeve et al. article, the paragraph entitled "Electrode manufacture".

In view of these teachings, the Reeve et al. article anticipates claims 1-3, 7, 8, 20-22, and 36-40.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
10. *Claims 1, 5, 7, 8, 11, 14-19, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobylinski et al. (U. S. Patent No. 3,840,389).*

Kobylinski et al. disclose catalysts prepared by coating a support (such as refractory oxides, or activated carbon, said support exhibiting a surface area from about 10 m²/g to about 500 m²/g; see paragraph 5) with a metal sulfide selected from the group consisting of (1) the sulfides of ruthenium and/or rhodium and (2) the sulfides of ruthenium and/or rhodium in combination with one or more of the sulfides of platinum, palladium, osmium, or iridium, and the product resulting therefrom. See paragraph 1 of Kobylinski et al. (claims 1, 5, 7, and 8).

The catalysts are prepared by impregnating the support (e.g., the refractory oxide) with a solution, aqueous or alcoholic, containing a dissolved salt of the

aforementioned metals (ruthenium, rhodium, etc.). Suitable salts include chlorides and nitrates; when an alcoholic solution is employed, any suitable alcohol (e.g., propanol), is satisfactory. Suitable impregnation can be obtained over a period ranging from about 15 minutes to about 6 hours; the temperature of treatment ranges from about 15° to about 95°C. Pressure is not critical (considered to read upon the limitations of **claim 15**) but generally atmospheric pressure will suffice. See paragraph 6 of Kobylinski et al.

The impregnated support is then treated with H₂S to precipitate the corresponding metal sulfide under conditions similar to those employed for impregnation. The impregnated support may also, if wet with water or alcohol after treatment with H₂S, may be dried at temperatures ranging from about 80°C to about 180°C. Drying can be effected in air, an inert atmosphere (such as nitrogen or H₂S). Further, the catalyst is preferably subjected to calcination at temperatures ranging from about 400°C to about 600°C; as in the drying step, calcination can be effected in air, an inert gas, such as nitrogen, or even H₂S. See paragraph 8 of Kobylinski et al. (**claims 11, 14, 16-19, 47, and 48**).

Kobylinski et al. does not explicitly disclose that the catalyst is an “electrocatalyst”, or that the support is “electrically conductive”. However, because the reference teaches the same components as recited in Applicants’ claims as the “electrocatalyst” and the “electrically conductive” support, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reasonably

expect that the catalysts of Kobylinski et al. would function as an “electrocatalyst” absent the showing of convincing evidence to the contrary.

It is well settled that when a claimed composition appears to be substantially the same as a composition disclosed in the prior art, the burden is properly upon the applicant to prove by way of tangible evidence that the prior art composition does not necessarily possess characteristics attributed to the CLAIMED composition. In re Spada, 911 F.2d 705, 15 USPQ2d 1655 (Fed. Circ. 1990); In re Fitzgerald, 619 F.2d 67, 205 USPQ 594 (CCPA 1980); In re Swinehart, 439 F.2d 2109, 169 USPQ 226 (CCPA 1971).

11. *Claims 2, 3, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobylinski et al. (U. S. Patent No. 3,840,389) as applied to claims 1, 5, 7, 8, 11, 14-19, 47 and 48 above, and further in view of Ito et al. (U. S. Patent No. 6,649,300).*

(Although Kobylinski et al. meet the limitations of claim 6 as addressed above, said claim is included in this rejection, as claim 6 depends from claim 3.)

Kobylinski et al. is relied upon for its teachings with respect to claims 1, 5, 7, 8, 11, 14-19, 47, and 48. Although the reference discloses activated carbon as a suitable support, and that, in general, the supports desirable for Patentees’ catalysts exhibit a surface area ranging from about 10 m²/g to about 500 m²/g, the reference does not disclose the support defined in claims 2 and 3.

Ito et al. is relied upon for its teachings regarding conductive carbon, such as conductive furnace black having surface areas ranging from 60 to 1500 m²/g, and their

employment as supports for electrode catalysts comprising metals such as ruthenium, osmium, rhodium, iridium, palladium, platinum, etc. See col. 3, lines 49-54 and col. 6, lines 29-60 of Ito et al.

Because both Kobylinski et al. and Ito et al. disclose catalysts containing similar metal components (see paragraph 6 of Kobylinski et al. and col. 5, lines 19-31 of Ito et al.) and supports, motivation to combine their respective teachings is deemed proper.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teachings of Kobylinski et al. by substituting therein the carbon supports of Ito et al. and thereby obtain Applicants' claimed invention.

Substitution of art-recognized equivalents (e.g., catalyst supports) is well within the level of ordinary skill in the art.

Claim Rejections - 35 USC § 102/ 35 USC § 103

12. Claims 5, 6, 11, 14-19, 47, and 48 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over R. W. Reeve et al. as further evidenced by Ito et al. (U. S. Patent No. 6,649,300, relied upon to provide technological background).

The Reeve et al. article and Ito et al. are relied upon for its teachings in the above 102(b) rejection. Claims 5, 6, 11, 14-19, 47, and 48 are product-by-process claims.

In the event any differences can be shown for the product of the product-by-process claims, as opposed to the product taught by the prior art, such differences

would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

Allowable Subject Matter

13. Claims 9, 10, 12, 13, and 41-46 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter:

The cited references of record do not teach or suggest the specific limitations of claim 9 (regarding a sulfide of ruthenium and cobalt) and claims 10, 12, 13, and 46 depending therefrom. The cited references also do not teach or suggest the limitations of claims 41-46.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia L. Hailey whose telephone number is (571) 272-1369. The examiner can normally be reached on Mondays-Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Patricia L. Hailey/plh
Examiner, Art Unit 1755
May 30, 2006



J.A. LORENGO
SUPERVISORY PATENT EXAMINER